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QUERY CONTROL FORM			RTIS USE ONLY		
Application No.	09/885,609	Prepared by	NPB	Tracking Number	05883815
Examiner-GAU	NE2MS-2818	Date	2/26/04	Week Date	115/04
		No. of queries	2		IFW

JACKET					
a. Serial No.	f. Foreign Priority	k. Print Claim(s)	p. PTO-1449		
b. Applicant(s)	g. Disclaimer	l. Print Fig.	q. PTOL-85b		
c. Continuing Data	h. Microfiche Appendix	m. Searched Column	r. Abstract		
d. PCT	i. Title	n. PTO-270/328	s. Sheets/Figs		
e. Domestic Priority	j. Claims Allowed	o. PTO-892	t. Other		

SPECIFICATION	MESSAGE				
	<p>① PTO-1449 forms (10 pages): Please either initial or line through citations. (Copy provided for reference).</p> <p>② There are two (2) claim 28's in the text. Please advise/renumber the claims in the index of claims and text, if necessary.</p>				
a. Page Missing					
b. Text Continuity					
c. Holes through Data					
d. Other Missing Text					
e. Illegible Text					
f. Duplicate Text					
g. Brief Description					
h. Sequence Listing					
i. Appendix					
j. Amendments					
k. Other					
CLAIMS					
a. Claim(s) Missing					
b. Improper Dependency					
c. Duplicate Numbers					
d. Incorrect Numbering	initials <i>MB</i>				
e. Index Disagrees					
f. Punctuation					
g. Amendments					
h. Bracketing					
i. Missing Text					
j. Duplicate Text					
k. Other					
RESPONSE <i>1449 entered</i>					
<p>The claim were corrected by applicant on 2/26/04 see Preliminary Amendment</p>					
initials <i>MB</i>					

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. AMAT/5351/CPI/L/B/ PJS	Serial No. 09/885,609				
SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Applicant Mak, et al.	Confirmation No.: 5337				
(Use several sheets if necessary)		Filing Date June 20, 2001	Group 2818				
U.S. Patent Documents							
*Examiner Initial	Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
MR	A1 6,139,700	10-31-2000	Kang, et al.	204	192.17	09-30-1998	
	A2						
	A3						
	A4						
	A5						
	A6						
	A7						
	A8						
	A9						
	A10						
	A11						
	A12						
	A13						
Foreign Patent Documents							
*Examiner Initial	Document Number	Date	Country	Class	Subclass	Translation	
						YES	NO
	B1					<input type="checkbox"/>	<input type="checkbox"/>
	B2					<input type="checkbox"/>	<input type="checkbox"/>
	B3					<input type="checkbox"/>	<input type="checkbox"/>
OTHER ART							
*Examiner Initial	Including Author, Title, Date, Pertinent Pages, Etc.						
MR	C1	PCT International Search Report from International Application No. PCT/US02/19481, Dated 08 January 2003.					
	C2						
	C3						
Examiner <i>MR</i>				Date Considered	4-9-04		
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(Use several sheets if necessary)		Filing Date June 20, 2002	Group 2818
Examiner Renee R. Berry			

U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
RRB	A1	6,481,945	11-19-2002	Hasper, et al.	414	217	06-04-1999
RRB	A2	6,478,872	11-12-2002	Chae, et al.	117	88	12-20-1999
RRB	A3	6,447,607	09-10-2002	Soininen, et al.	117	200	12-27-2000
RRB	A4	6,231,672	05-15-2001	Choi, et al.	118	715	05-18-1999
RRB	A5	6,183,563	02-06-2001	Choi, et al.	118	715	05-18-1999
RRB	A6	2002/0134307	09-26-2002	Choi	118	715	11-30-2000
RRB	A7	2002/0108570	08-15-2002	Lindlors	118	715	04-16-2001
RRB	A8	2002/0094689	07-18-2002	Park	438	694	03-07-2002
RRB	A9	2002/0092471	07-18-2002	Kang, et al.	118	715	01-16-2002
RRB	A10	2002/0086106	07-04-2002	Park, et al.	427	248.1	11-07-2001
RRB	A11	2002/0041931	04-11-2002	Suntola, et al.	427	255.28	05-14-2001
RRB	A12	2002/0007790	01-24-2002	Park	118	715	05-03-2001
RRB	A13	2002/0000196	01-03-2002	Park	118	715	05-03-2001

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
RRB	B1	EP 1 167 569 ✓	01-02-2002	EP	C23C	16/455	DE	X
RRB	B2	WO 02/08488 ✓	01-31-2002	WIPO	C23C	16/44	DE	X
RRB	B3	WO 01/17692 ✓	03-15-2001	WIPO	B05C	11/00	DE	X
RRB	B4	WO 99/65064 ✓	12-16-1999	WIPO	H01L	21/00	DE	X

OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C1	
	C2	

Examiner Renee R. Berry Date Considered 4-9-06

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(Use several sheets if necessary)			
	Examiner Renee R. Berry		

U.S. Patent Documents

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RR	A14	2002/0052097	05-02-2002	Park	438	507	05-03-2001
RR	A15	2001/0054377	12-27-2001	Lindfors, et al.	117	104	04-16-2001
RR	A16	2001/0042523	11-22-2001	Kesala	122	6.6	05-14-2001
RR	A17	2001/0014371	08-16-2001	Kilpi	427	255.28	12-27-2000
RR	A18	2001/0013312	08-16-2001	Soininen, et al.	117	86	12-27-2000
RR	A19	2001/0009140	07-26-2001	Bondestam, et al.	118	725	01-25-2001
	A20						RECD MAIL ROOM
	A21						RECD MAIL ROOM
	A22						RECD MAIL ROOM
	A23						RECD MAIL ROOM
	A24						RECD MAIL ROOM
	A25						RECD MAIL ROOM
	A26						RECD MAIL ROOM

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
	B5							
	B6							
	B7							

OTHER ART

*Examiner Initial Including Author, Title, Date, Pertinent Pages, Etc.

C3

C4

C5

Examiner *Renee R. Berry* Date Considered *4-4-04*

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Complete if Known

Application Number	09/885,609
Filing Date	06/20/2001
First Named Inventor	Mak et al.
Group Art Unit	2812
Examiner Name	unassigned
Attorney Docket Number	5351/AMI-00-12

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

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Signature

McAfee

Date
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4-4-10

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Sheet

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Application Number	09/885,609
Filing Date	06/20/2001
First Named Inventor	Mak et al.
Group Art Unit	2812
Examiner Name	unassigned
Attorney Docket Number	5351/AMI-00-12

OTHER PRIOR ART : NON-PATENT LITERATURE DOCUMENTS

Examiner
Signature

McCurdy

Date Considered

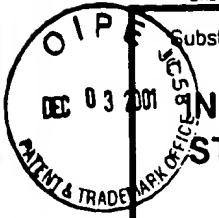
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<p>Substitute for form 1449A/PTO</p> <p>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</p> <p>(use as many sheets as necessary)</p>				<p>Complete if Known</p> <table border="1"> <tr> <td>Application Number</td> <td>09/885,609</td> </tr> <tr> <td>Filing Date</td> <td>06/20/2001</td> </tr> <tr> <td>First Named Inventor</td> <td>Mak et al.</td> </tr> <tr> <td>Group Art Unit</td> <td>2812</td> </tr> <tr> <td>Examiner Name</td> <td>Unassigned</td> </tr> <tr> <td>Attorney Docket Number</td> <td>5351/AMI-00-12</td> </tr> </table>	Application Number	09/885,609	Filing Date	06/20/2001	First Named Inventor	Mak et al.	Group Art Unit	2812	Examiner Name	Unassigned	Attorney Docket Number	5351/AMI-00-12
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Examiner Name	Unassigned															
Attorney Docket Number	5351/AMI-00-12															
Sheet	1	of	4													

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.*	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-Y-YY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code* (if known)			
MM	AI	4,058,430		Suntola et al.	11-15-1977	—
MM	AJ	4,389,973		Suntola et al.	06-28-1983	—
MM	AK	4,413,022		Suntola et al.	11-01-1983	—
MM	AL	4,767,494		Kobayashi et al.	08-30-1988	—
MM	AM	4,806,321		Nishizawa et al.	02-21-1989	—
MM	AN	4,840,921		Matsumoto	06-20-1989	—
MM	AO	4,845,049		Sunakawa	07-04-1989	—
MM	AP	4,859,627		Sunakawa	08-22-1989	—
MM	AQ	4,861,417		Mochizuki et al.	08-29-1989	—
MM	AR	4,876,218		Pessa et al.	10-24-1989	—
MM	AS	4,993,357		Scholz	02-19-1991	—
MM	AT	5,082,798		Arimoto	01-21-1992	—
MM	AU	5,130,269		Kitahara et al.	07-14-1992	—
MM	AV	5,166,092		Mochizuki et al.	11-24-1992	—
MM	AW	5,225,356		Yoder	07-06-1993	—
MM	AX	5,250,148		Nishizawa et al.	10-05-1993	—
MM	AY	5,255,344		Ackerman	10-26-1993	—
MM	AZ	5,270,247		Sakuma et al.	12-14-1993	—
MM	BA	5,278,435		Van Hove et al.	01-11-1994	—
MM	BB	5,281,274		Yoder	01-25-1994	—

FOREIGN PATENT DOCUMENTS

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 4

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Application Number	09/885,609
Filing Date	06/20/2001
First Named Inventor	Alfred W. Mak
Group Art Unit	2812
Examiner Name	Unassigned
Attorney Docket Number	5351/AMI-00-12

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code* (if known)			
MM	BC	5,290,748		Knuutila et al.	03-01-1994	_____
MM	BD	5,294,285		Nishizawa et al.	03-15-1994	_____
MM	BE	5,300,185		Kihara et al.	04-05-1994	_____
MM	BF	5,315,793		Wallace et al.	05-31-1994	_____
MM	BG	5,330,610		Eres et al.	07-19-1994	_____
MM	BH	5,335,324		Stall et al.	08-09-1994	_____
MM	BI	5,338,389		Nishizawa et al.	08-16-1994	_____
MM	BJ	5,374,570		Nasu et al.	12-20-1994	_____
MM	BK	5,395,791		Cheng et al.	03-07-1995	_____
MM	BL	5,443,033		Nishizawa et al.	08-22-1995	_____
MM	BM	5,443,647		Aucoin et al.	08-22-1995	_____
MM	BN	5,458,084		Thome et al.	10-17-1995	_____
MM	BO	5,480,818		Matsumoto et al.	01-02-1996	_____
MM	BP	5,484,664		Kihara et al.	01-16-1996	_____
MM	BQ	5,483,919		Yokoyama et al.	01-16-1996	_____
MM	BR	5,532,511		Nishizawa et al.	07-02-1996	_____
MM	BS	5,637,530		Gaines et al.	06-10-1997	_____
MM	BT	5,693,139		Nishizawa et al.	12-02-1997	_____
MM	BU	5,705,224		Murota et al.	01-06-1998	_____
MM	BV	5,711,811		Suntola et al.	01-27-1998	_____

FOREIGN PATENT DOCUMENTS

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Attorney Docket Number	5351/AMI-00-12															
Sheet	3	of	4													

U.S. PATENT DOCUMENTS

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President

Date Considered

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¹known citation designation number. ²See attached Kind of U.S. Patent Document(s). ³Enter Office that issued the document, by the two-letter

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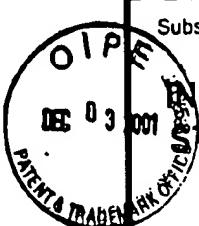
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet

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<i>Complete if Known</i>	
Application Number	09/885,609
Filing Date	06/20/2001
First Named Inventor	Alfred W. Mak
Group Art Unit	2812
Examiner Name	Unknown
Attorney Docket Number	5351/AMI-00-12

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

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Date
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet

1

of

1

Complete if Known

Application Number	Unassigned
Filing Date	Herewith
First Named Inventor	Mak, Alfred
Group Art Unit	Unassigned
Examiner Name	Unassigned
Attorney Docket Number	5351 / AMI-00-12

U.S. PATENT DOCUMENTS

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McGraw

**Date
Considered**

4-4-00

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sequentially repeating the exposure to the first and second reactive gases until an adhesion layer having a desired thickness is formed;
exposing the substrate surface to a third reactive gas;
exposing the substrate surface to a fourth reactive gas; and then
sequentially repeating the exposure to the third and fourth reactive gases until a barrier layer having a desired thickness is formed over the adhesion layer.

27. (Original) The method of claim 26, wherein the first reactive gas comprises a refractory metal-containing compound.

→ 28. (Original) The method of claim 27, wherein the refractory metal-containing compound comprises TDMAT, TDEAT, $TiCl_4$, or combinations thereof.

→ *K* *Claim 29*
[[28]] 29. (Currently Amended) The method of claim 27, wherein the second precursor gas comprises a reducing compound.

[[29]] 30. (Currently Amended) The method of claim [[28]] 29, wherein the reducing compound comprises H_2 , B_2H_6 , SiH_4 , NH_3 , or combinations thereof.

[[30]] 31. (Currently Amended) The method of claim 27, wherein the third precursor gas comprises a refractory metal-containing compound.

[[31]] 32. (Currently Amended) The method of claim [[30]] 31, wherein the refractory metal-containing compound comprises tungsten.

[[32]] 33. (Currently Amended) The method of claim 27, wherein the fourth comprises a reducing compound.

[[33]] 34. (Currently Amended) The method of claim [[32]] 33, wherein the reducing compound comprises SiH_4 , B_2H_6 , NH_3 , or combinations thereof.

[[34]] 35. (Currently Amended) The method of claim 26, further comprising depositing copper at least partially over the barrier layer.

[[35]] 36. (Currently Amended) The method of claim 26, wherein the adhesion layer is deposited within a first processing chamber.

[[36]] 37. (Currently Amended) The method of claim [[35]] 36, wherein the barrier layer is deposited within a second processing chamber.

[[37]] 38. (Currently Amended) The method of claim [[36]] 37, wherein the copper is deposited in a third processing chamber.

[[38]] 39. (Currently Amended) The method of claim [[37]] 38, wherein the first, second and third processing chambers are each disposed about a common mainframe.

[[39]] 40. (Currently Amended) The method of claim [[35]] 36, wherein the adhesion layer and the barrier layer are both deposited in the first chamber.

[[40]] 41. (Currently Amended) A method for depositing a barrier layer on a substrate surface, comprising:

sequentially exposing the substrate surface to a first refractory metal-containing compound and a first reducing compound; and

sequentially exposing the substrate surface to a second refractory metal-containing compound and a second reducing compound to form the barrier layer.

[[41]] 42. (Currently Amended) The method of claim [[40]] 41, wherein the first refractory metal-containing compound comprises TDMAT, TDEAT, TiCl₄, or combinations thereof.

[[42]] 43. (Currently Amended) The method of claim [[40]] 41, wherein the second refractory metal-containing compound comprises tungsten.

[[43]] 44. (Currently Amended) The method of claim [[40]] 41, wherein the first and second reducing compounds is selected from a group consisting of SiH₄, B₂H₆, NH₃, and combinations thereof.

[[44]] 45. (Currently Amended) The method of claim [[40]] 41, wherein the barrier layer comprises titanium, titanium nitride, tungsten, tungsten nitride, or combinations thereof.

[[45]] 46. (Currently Amended) The method of claim [[40]] 41, wherein the adhesion layer is deposited within a first processing chamber and the barrier layer is deposited within a second processing chamber.

[[46]] 47. (Currently Amended) The method of claim [[40]] 41, further comprising depositing copper at least partially over the barrier layer.

[[47]] 48. (Currently Amended) The method of claim [[46]] 47, wherein the adhesion layer is deposited within a first processing chamber and the barrier layer is deposited within a second processing chamber.

[[48]] 49. (Currently Amended) The method of claim [[47]] 48, wherein the copper is deposited in a third processing chamber and the first, second and third processing chambers are each disposed about a common mainframe.

[[49]] 50. (Currently Amended) The method of claim [[47]] 48, wherein the adhesion layer and the barrier layer are both deposited in the first chamber.

[[50]] 51. (Currently Amended) A method for forming a metal contact on a substrate surface, comprising:

sequentially exposing the substrate surface to a titanium-containing compound and a nitrogen-containing compound to form an adhesion layer comprising titanium nitride;

sequentially exposing the substrate surface to a tungsten-containing compound and a reducing compound to form a barrier layer comprising tungsten; and

depositing copper at least partially over the barrier layer to form the metal contact.

[[51]] 52. (Currently Amended) The method of claim [[50]] 51, wherein the tungsten-containing compound comprises TDMAT, TDEAT, TiCl₄, or combinations thereof.

[[52]] 53. (Currently Amended) The method of claim [[50]] 51, wherein the reducing compound is selected from a group consisting of SiH₄, B₂H₆, NH₃, and combinations thereof.

[[53]] 54. (Currently Amended) The method of claim [[50]] 51, wherein the adhesion layer is deposited within a first processing chamber and the barrier layer is deposited within a second processing chamber.

[[54]] 55. (Currently Amended) The method of claim [[53]] 54, wherein the copper is deposited in a third processing chamber and the first, second and third processing chambers are each disposed about a common mainframe.